

# A CONTRIBUTION TO THE FLORA OF KHATLING GLACIER IN THE GARHWAL HIMALAYA (DISTRICT - TEHRI), U.P.<sup>1</sup>

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(With a text-figure)

In spite of several attempts by plant explorers in Garhwal Himalaya, many of the alpine zones have practically remained untouched. Khatling Glacier, a botanically little known alpine zone is the source of the Bhillangana river, a tributary to the Ganges in Tehri District, U.P. The article briefly describes the angiosperms collected from Khatling during the years 1984-85. The area under study lies between 30° 31' 75"-30° 47' 16" N and 78° 47' 50"-78° 57' 2" E, covering an elevation range of 1500 m a.s.l. to 3800 m a.s.l. The dominant families of this zone are Ranunculaceae, Fabaceae, Scrophulariaceae, Rosaceae, Saxifragaceae, Lamiaceae, Apiaceae, Astera-ceae, Primulaceae, Polygonaceae, Orchidaceae, Poaceae. A total number of 464 species and 286 genera represented by 87 families have been recorded.

## INTRODUCTION

The Himalaya has received great attention on various aspects of plant study. However, several interesting zones, still provide significant areas for investigations. Khatling has a great variety of landscapes, climate, flora and fauna with scores of snowy peaks, many of which exceed 6000 m elevation and have their own garlands of glaciers descending in different directions. The river Bhillangana, the main tributary of the Ganges originates from this glacial zone. Mythologically the famed peak Khatling, associated with the name of Lord Shiva, is considered sacred.

This zone of the Himalaya has received comparatively less attention from early botanists due to lack of transport facilities and the presence of natural barriers, rivers and several streamlets during the monsoon. The only noteworthy contributions in the present century

were those by Duthie (1906), Osmaston (1927), Smythe (1932, 1938) and Ghildyal (1956). During the last three decades several collectors have trekked through different pockets of Garhwal Himalaya (Rau 1961, 1963, 1975; Gupta 1955, 1957, 1962; Naithani 1967, 1982; Dey *et al.* 1968; Bhattacharyya and Malhotra 1982; Bhattacharyya and Goel 1982; Gaur and Semwal 1983; Semwal 1981, 1984; Kala and Gaur 1982; Hajra and Jain 1983; Negi *et al.* 1985). However, no special emphasis has been given to the flora of this interesting zone of the Khatling Glacier.

In order to fill up the lacuna, explorations in many remote and virgin areas, which were unapproachable in the past, were conducted. Khatling zone as a whole has been undertaken for the study by the Garhwal University in 1984-85 under the "All India Co-ordinated Research Project on Ethnobiology". Keeping this in view, the information about the local names has been gathered besides the floristic study of the area.

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## GEOGRAPHY AND CLIMATE

The Khatling Glacier in Tehri District is surrounded by snow peaks of the Jogin Group (6466 m); Sphetic Brishtvon (6905 m); Kirtistambha (6402 m); Bartekanta and Meru (6579 m). It is situated at a height of 3658 m a.s.l. and lies in between 30°31'75" to 30°47'16" N and 78°47'50" to 78°57'2" E. It is also known for the grandeur of natural beauty, including wild flora and fauna, meadows, rivers and panoramic scenes. The explored area includes sub-tropical zones to alpine zone ranging from 1500 m to 3800 m a.s.l. The approach to the Khatling begins at Ghutoo, a place connected to Rishikesh, Dehradun and Srinagar. Ghutoo is the last bus terminus from where one has to trek 45 Km. to the Khatling Glacier. The route leads through Reeh and Gangi. Gangi, enroute to Khatling Glacier, is the last inhabited village. The 25 Km spectacular hill route runs through dense forest and meadows like Deokhuri, Kalyani, Sonari, Birodh, Paayara, Jalkala, Banglani, Henuri, Tonyaroo, Soonaroo, Kharsoli, Pachari, Rairpharkot, Naumuthia, Bhelbagi, Bhumka, Tamakund, and Bajloo to reach the Khatling Glacier. (Fig. 1). The area fascinates visitors and travellers all round the year from all over India and elsewhere.

The hilly topography with gradual slopes has sub-tropical, temperate, alpine scrubs and alpine meadows which serve as good grazing pastures for sheep and goats.

Gangi (2500 m), has temperate and alpine zones, and the climatic conditions include fog, heavy hailstorms, extremely low temperature, high light intensity, high wind velocity and lower oxygen and carbon dioxide concentration. The upper reaches of Kharsoli and upper mountainous limits of the area are covered with snow for nearly 7-8 months in a year.

## VEGETATION AND FLORISTIC COMPOSITION

The vegetation of Khatling is characterised

by a comparatively lush flora represented by sub-tropical, temperate and alpine species in response to altitude. The sub-tropical terraced fields at Dhooperdhar and Ghutoo are spotted with shrubs of *Rosa brunonii*, *Debregeasia salicifolia*, *Prinsepia utilis*, *Berberis chitria*, *Desmodium laxiflorum*, *D. sambuense*, *Zanthoxylum armatum* mixed with *Alnus nepalensis*, *Lyonia ovalifolia*, *Rhus parviflora*, *Ficus cunia*, *F. scandens* and common sub-tropical herbs like *Dicrocephala integrifolia*, *Urtica parviflora*, *Cirsium wallichii* and several others.

Ghutoo is a well known centre as a market, where villagers bring many articles of food (wild as well as cultivated), medicinal plants, wool etc. and interchange them for articles for their daily need.

Reeh is located at 10 km distance from Ghutoo. Leaving the village, the track joins a mule track through the Pine forest and leads to Gangi. From Reeh to Gangi the distance is about 10 km and *Pinus roxburghii*, *Quercus leucotrichophora*, *Eurya acuminata*, *Ilex dipyrrena*, *Symplocos ramosissima*, *Juglans regia*, *Myrica esculenta*, *Coriaria nepalensis*, *Coton-easter affinis*, var. *bacillaris*, *Cinnamomum tamala*, *Neolitsea umbrosa*, *Euonymus tingens*, and *Viburnum cotinifolium* form the mixed forests. Some of the well represented undergrowth of these forests are *Flemingia vestita*, *Myriactis nepalensis*, *M. wallichii*, *Delphinium roylei*, *Boenninghausenia albiflora*, *Galinsoga parviflora*, *Veronica agrestis*, *Circaea imaicola*, *Murdania divergens*, *Mondo intermedium*, *Tragopogon gracilis*, *Spiranthes sinensis*, *Goodyera repens*, *Malaxis cylindrostachya*, *Gentiana capitata*, *Sopubia trifida* with climbers such as *Holboellia latifolia*, *Schisandra grandiflora*, *Clematis connata*, *C. montana*, *Galium rotundifolium*, *Rubia cordifolia* and *Smilax glaucophylla*.

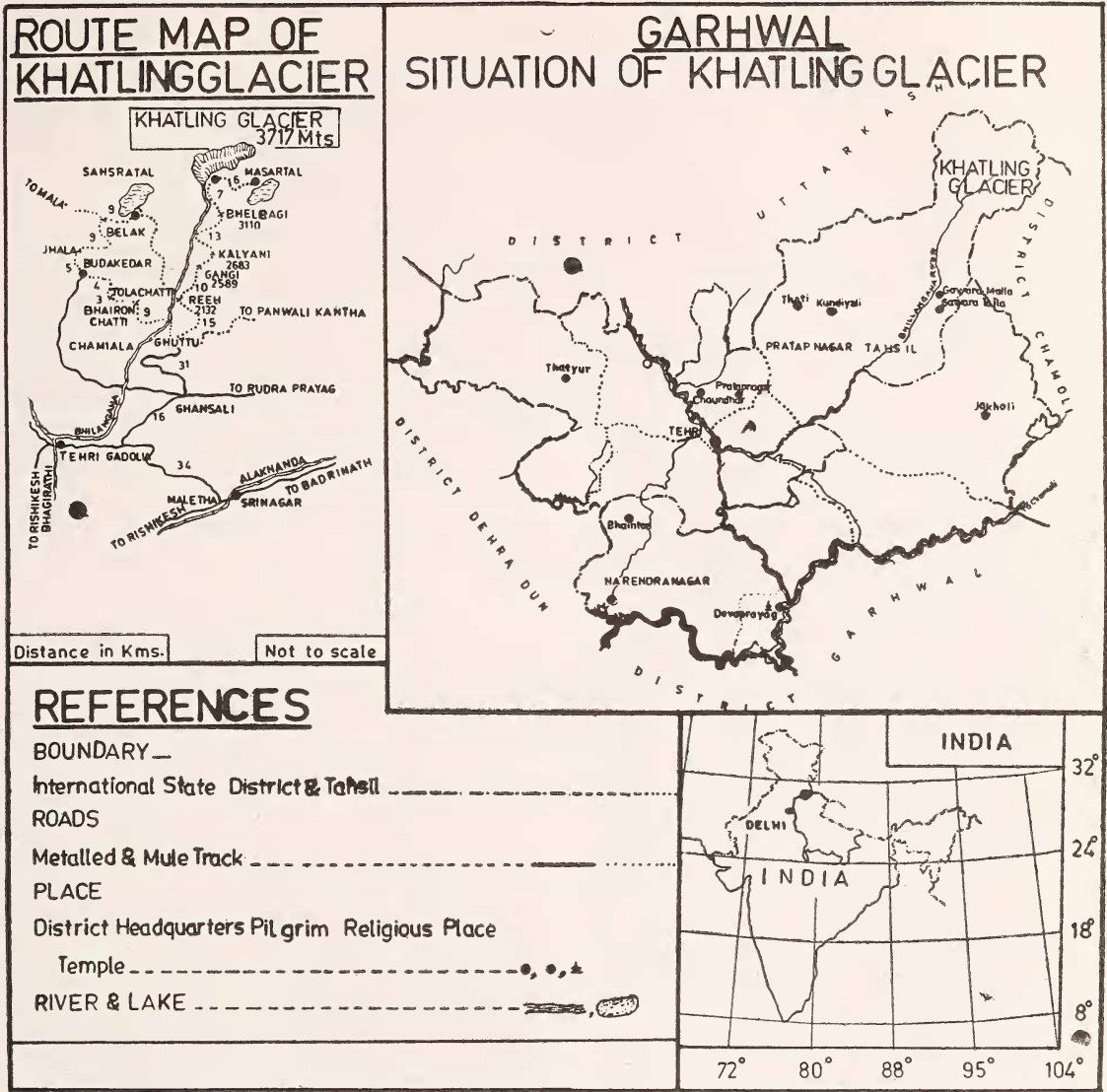


Fig. 1. Map of Khatling Glacier.

Gangi, the last inhabited village on way to Khatling, is well known for its Gangwal tribes, of approximately 120 families living in their own culture. The inhabitants of Gangi are simple and by nature extremely hospitable to visitors. They have deep sense of aesthetic

beauty which finds expression in their works of household art.

There are a number of meadows after Gangi which hold a lush flora and present a beautiful sight.

The typical alpine grasslands or meadows



are composed mainly of the clumps of *Danthonia cachymeriana*, *Dactylis glomerata*, *Deyeuxia pulchella*, *D. scabrescens*, *Kobresia nitens*, and *Phelum alpinum*. Some characteristic alpine herbs found within these clumps are *Corydalis cashemiriana*, *C. cornuta*, *C. govaniiana*, *C. meifolia*, *Saxifraga brunoniana*, *S. diversifolia*, *S. filicaule*, *Aconitum heterophyllum*, *Orchis latifolia*, *Delphinium vestitum*, *Heraclium candicans* and *Selinum vaginatum*.

An interesting plant *Carex rostrata* Stocks has been collected for the first time from the area.

There are temporary settlements of tribal population from April-Oct., of 4 or 5 families in different meadows, i.e. Deokhuri, Sonari, Kalyani and upto Birodh with their sheep, goats, buffaloes and cows. In addition to the cattle rearing, they cultivate *Fagopyrum esculentum*, and *Solanum tuberosum*.

The higher elevation of Bhelbagi represents temperate vegetation consisting of trees and shrubs such as *Quercus semecarpifolia*, *Abies pindrow*, *Acer caesium*, *Caraegna brevisipina*, *Betula utilis*, *Lonicera myrtillus*, *L. quinquelocularis*, *Piptanthus nepalensis*, *Ribes alpestre*, *R. glaciale*, *Sorbus cuspidata*, *Syringa emodi*, *Sorbus foliolosa*, *S. aucuparia*, *Taxus wallichiana*, and ground vegetation of species of *Aconitum*, *Aster*, *Fragaria*, *Gentiana*, *Morina*, *Jurinea*, *Rumex*, *Rheum*, *Pleurospermum*, *Potentilla*, *Selinum*, and other.

Khatling can be clearly seen from a point, Bhelbagi, 4 km after the meadow. The Khatling massif is a tall straight rock having a broad base and a narrow peak thus having a pyramidal outline, which is always snow covered. There are many peaks surrounding the Khatling, such as, Rachotra, Chatangrya, Patangrya., Konagaroo while on the other side Rutangaira, Lamdokhari, Khaameem, Muglanya, Kunalaya can be seen encircling either side of Khatling. Across the glacier a

route leads to Mahisartal or Masurtal. The journey is rather difficult as the route is through the glacier interspread with large crevices and there is always the risk of losing foothold or of being hit by falling boulders.

A big stone everhangs in the shape of a cave at Bhumka, where usually trekkers take rest even at night. Blackish granite boulders flanked by snow begin at Bhelbagi and provide a typical habitat for *Meconopsis aculeata*, *Saussurea obvallata*, *S. graminifolia*, *S. simpsoniana*, *S. taraxacifolia*, *Leontopodium alpinum*, *Sedum quadrifidum*, *S. linerifolium*, *Achillea millefolium* and several other species.

The last energetic and adventurous trekking is almost over the permanent snow line and the glacier is visible, amidst the vast panorama of the distant mountains of Chauki, Dandakharak and Khatling proper.

A few and interesting species of the rocky slopes are the peculiar woolly *Saussurea obvallata*, *S. simpsoniana*, *Salix daphnoides*, *S. furcata*, and other herbs like *Rheum emodi*, *Allium stracheyi*, *Rumex acetosa* and *Megacarpaea polyandra*.

In rocky areas grow herbs like *Sagina saginoides*, *Sedum linearifolium*, *S. quadrifidum*, *Saxifraga filicaulis*, *Swertia cordata*, *Rhodiola crenulata*, *Primula elliptica*, *P. floribunda*, *Androsace sarmentosa*, *Pleurospermum angelicoides*, *Thermopsis barbata*, *Lysimachia alternifolia*, *L. pyramidalis*, *Filipendula vestita*, *Arabidopsis himalayana*, *Nardostachys grandiflora*, *Erigeron alpinus*, *Valeriana hardwickii*, *Gentiana carinata*.

*Gentianella tenella*, *G. stipitata*, and alpine grasses are quite common. The route passes through a wide boulder spread basin which occupies a considerable area and terminates in the Khatling Glaciers, a vast glacier and from an ice cave in its snout emerges the Bhillingana and flows down towards Tehri, where it meets with Bhagirathi.



ENUMERATION OF SPECIES

Collections were made during the year 1984-85. The specimens were compared with authentic specimens at the Herbarium of Botanical Survey of India, Northern Circle, Dehradun (BSD). The local names of the plants, where available, have been given after the botanical names and localities with altitude have also been mentioned. Field number of each specimen is given in bracket and the specimens are preserved in the Herbarium of the Garhwal University, Srinagar, U.P. (GUH). Bentham and Hooker's system is followed with slight modification as proposed by Hutchinson (1973) in the arrangement of families.

DICOTYLEDONS

RANUNCULACEAE

**Aconitum atrox** (Bruhl) Mukerjee (Loc.-Meetha Bish)

Syn. *A. balfourii* Stapf

Large erect herb with blue flowers. Kharsoli, 2800 m. Sept. 1985 (5053).

**A. heterophyllum** Wall. ex Royle (Loc.-Atis)

Small herb, stem leaves sessile, not lobed while lower leaves 3-5 lobed. Flowers dull blue purple veined. Paachari, 2800 m. May 1984 (1053).

**A. violaceum** Jacq. ex Stapf (Loc.-Dudhiya atees, Patees)

Syn. *A. napellus* var. *multifidum* (Royle) Hk.

Erect small herb with blue flowers. Bhumka, 3200 m. Nov. 1985 (4536).

**Actaea spicata** Linn. var. *acuminata* (Wall. ex Royle) Hara

Erect herb with white flowers and globose fruits. Kharsoli, 2800 m. July 1984 (5608).

**Anemone obtusiloba** D. Don

Tufted herb with variable colour of flowers, white, lemon yellow, deep blue or sometimes

white with purple veins. Bhelbagi, 3100 m. May 1984 (4813).

**Aquilegia pubiflora** Wall. ex Royle

Large pubescent herb. Flowers drooping, dark purple. Kalayani, 2600 m. June 1984 (1231).

**Caltha palustris** Linn.

Glabrous herb with bright yellow flowers. Bhelbagi, 3100 m. May 1984 (979).

**Clematis connata** DC.

Glabrous climber with cream white bell shaped flowers. Gangi, 2500 m. July 1984 (1232, 3115).

**C. montana** Buch.-Ham. ex DC.

Large climber on *Prunus* spp. in Oak-Rhododendron forest. Flowers white. Gangi, 2500 m. April 1984 (1229).

**C. puberula** Hook. f. et Thoms.

Syn. *C. nutans* Royle

Downy climber with pale yellow flowers. Reeh, 2100 m. April 1984 (628).

**Delphinium roylei** Munz.

Large hoary herb with blue flowers. Gangi, 2500 m. May 1984 (1235).

**D. vestitum** Wall. ex Royle (Loc.-Nirbishi)

Large hairy herb with dull blue flowers. Bhelbagi, 3100 m. Aug. 1985 (1230).

**Oxygraphis polypetala** (Royle) Hook. f. et Thoms.

Small tufted herb with bright yellow flowers. Bhumka, 3200 m. June 1984 (1236).

**Ranunculus hirtellus** Royle ex D. Don

Hairy herb with yellow flowers. Bhelbagi, 3100 m. May 1984 (724).

**R. diffusus** DC.

Decumbent hairy herb with bright yellow flowers. Reeh, 2100 m. June 1984 (808).

**R. laetus** Wall.

Herb with yellow flowers. Reeh, 2100 m. June 1984 (725).

**Thalictrum alpinum** Linn.

Small herb with yellowish green flowers. Bajloo, 3500 m. June 1984 (1228).

**T. cultratum** Wall. subsp. **platycarpum** (Hook. f. et Thoms.) Bruhl.

Syn. *T. platycarpum* Hook. f. et Thoms.

Glabrous herb with greenish-white flowers. Bhelbagi, 3100 m. June 1984 (1253).

**T. javanicum** Blume (Loc.-Pilijari)

Large herb with white flowers. Reeh, 2400 m. June 1984 (817).

PAEONIACEAE

**Paeonia emodi** Wall. ex Royle (Loc.-Tonkanya)

Large erect herb with white flowers in the axils of upper leaves. Ghutoo, 1500 m. April 1984 (457).

SCHISANDRACEAE

**Schisandra grandiflora** (Wall.) Hook. f. (Loc.-Jogna)

Climber in Oak-Rhododendron forest with white fragrant flowers. Gangi, 2500 m. May 1984 (4506).

LARIDZABALACEAE

**Holboellia latifolia** Wall var. **angustifolia** Hook. f. (Loc.-Gomphala)

Large climber. Flowers dark-purple-brown and fragrant flowers. Leaflets 7-9, narrow. Gangi, 2500 m. June 1984 (4524).

**H. latifolia** Wall. var. **latifolia** Wall. (Loc.-Gomphal)

Large climber with dark purple brown and fragrant flowers. Leaflets 3-5, narrow. Gangi, 2500 m. June 1984 (4524).

BERBERIDACEAE

**Berberis aristata** DC. (Loc.-Kingor)

Large shrub, yellow flowers with blue berries. Pachari, 2800 m. June 1984 (4630).

**B. jeschkeana** Schneid. (Loc.-Kingore, Choter)

Dwarf shrub, yellow flowers with red berries. Paachari, 2800 m. June 1984 (1237).

**B. lycium** Royle (Loc.-Choter)

Large shrub. Yellow flowers with blue berries. Birodh, 2700 m. June 1984 (4630).

PODOPHYLLACEAE

**Podophyllum hexandrum** Wall. ex Royle (Loc.-Ban Kakri)

Syn. *P. emodi* Wall. ex Hook. f. et Thoms.

Large erect rhizomatous herb. Flowers pinkish white and orange yellow fruit. Bhumka, 3200 m. June 1984 (4525).

PAPAVERACEAE

**Meconopsis aculeata** Royle

Prickly herb with blue purple flowers. Tamakundo, 3400 m. June 1984 (4819).

FUMARIACEAE

**Corydalis cashemiriana** Duthie ex Prain (Loc.-Mamiri)

Small herb. Flowers sky blue with dark blue tips. Naumuthia, 2900 m. July 1984 (1240).

**C. cornuta** Royle

Small herb with bright yellow flowers. Bhumka, 3200 m. July 1984 (1239).

**C. govaniana** Wall. (Loc.-Mamiri)

Erect herb with bright yellow flowers. Bhumka, 3200 m. July 1984 (1239).

**C. meifolia** Wall.

Herb. Flowers yellow with purple tips. Khatling, 3600 m. Aug. 1985 (1238).

BRASSICACEAE

**Arabidopsis himalaica** (Edgew.) O. E. Schulz.

Syn. *Sisymbrium himalaicum* Edgew.

Herb with white purple flowers. Bhumka, 3200 m. May 1984 (5731).

FLORA OF KHATLING GLACIER

**Erysimum hieraciifolium** Linn.

Erect herb with orange-yellow flowers. Deokhuri, 2700 m. Oct. 1985 (1241).

**Megacarpaea polyandra** Benth.  
(Loc.-Barmoola)

Large herb with light yellow flowers. Bhel-bagi, 3100 m. June 1984 (5103).

POLYGALACEAE

**Polygala crotalarioides** Buch.-Ham. ex DC.

Hairy decumbent with pink flowers. Sonari, 2600 m. Aug. 1984 (701).

VIOLACEAE

**Viola betonicifolia** subsp. **nepalensis** Backer  
(Loc.-Dundibirali)

Syn. *V. patrini* var. *nepalensis* DC.

Small herb with yellow flowers, lower petal streaked black. Kharsoli, 2800 m. June 1984 (4567).

**V. biflora** Linn.

Decumbent herb with yellow flowers. Paachari, 2800 m. June 1984 (2708).

**V. canescens** Wall. ex Roxb. (Loc.-Banfasha)

Stemless pubescent herb with white flowers. Jalkala, 2700 m. May 1984 (820).

CARYOPHYLLACEAE

**Gypsophylla cerastioides** D. Don

Hairy herb with white flowers. Bajloo, 3500 m. May 1984 (4628).

**Sagina saginoides** (Linn.) Karsten

Syn. *S. procumbens* Edgew.

Small glabrous herb with white flowers on rocks. Gangi, 2500 m. May 1984 (1014).

**Silene inflata** Smith (Loc.-Tumri)

Glabrous herb with white flowers. Naumuthia, 2900 m. July 1984 (4628).

**Silene laxantha** Majumdar

Syn. *S. pilosa* Edgew.

Hairy herb with purple flowers on rocks. Saura, 2800 m. Aug. 1984 (989).

**S. thomsonii** Majumdar (Loc.-Tumri)

Syn. *S. indica* Roxb. et Otth.

*Lychnis nutans* Benth.

Glandular herb with green, purple veined flowers. Saura, Banglani, 2900 m. June 1984 (866).

**Stellaria monosperma** var. **paniculata** (Edgew.) Majumdar

Syn. *S. paniculata* Edgew.

Pubescent herb with white flowers. Naumuthia, 2900 m. Aug. 1985 (741).

**S. patens** D. Don

Syn. *S. longissima* Wall.

Glabrous as well as hairy herb with white flowers. Banglani, 2700 m. June 1984 (868).

HYPERICACEAE

**Hypericum elodeoides** Choisy

Herb with yellow flowers. Deokhuri, 2700 m. Aug. 1984 (787, 1744).

**H. oblongifolium** Choisy (Loc.-Phenuli, Basanti)

Syn. *H. cernuum* Roxb.

Shrub with yellow fragrant flowers. Reeh, 2100 m. April 1984 (674).

**Norisca urala** (Hamilt. f.) Koch.

Syn. *Hypericum patulum* Thunb.

Evergreen shrub with yellow flowers in Oak-Rhododendron forest. Reeh, 2100 m. Aug 1985 (975).

TERNSTROEMIAACEAE

**Eurya acuminata** DC.

Small tree with fragrant flowers and green slender fruit in Oak-Rhododendron forest. Gangi, 2500 m. Sept. 1985 (1242).

MALVACEAE

**Hibiscus pungens** Roxb.

Erect herb. Flowers yellow with purple



centre. Ghutoo, 1500 m. Aug. 1984 (672).

**Malva verticillata** Linn.

Large erect herb with purplish flowers. Gangi, 2500 m. Aug. 1984 (4568).

TILIACEAE

**Triumfetta pilosa** Roth.

Large herb with yellow flowers. Fruits densely pubescent with hooked spines. Reeh, 2400 m. June 1984 (1220).

LINACEAE

**Linum mysorensense** Heyne

Glabrous herb with yellow flowers. Reeh, 2100 m. Aug. 1984 (789).

GERANIACEAE

**Geranium ocellatum** Camb.

Hairy herb with pinkish white flowers. Deokhuri, 2700 m. June 1984 (1043).

BALSAMINACEAE ..

**Impatiens brachycentra** Kar. & Kir.

Glabrous herb with white flowers. Raipharkot, 2800 m. Aug. 1984 (1243).

**I. roylei** Walp.

Herb with pale purple flowers. Pachari, 2800 m. Aug. 1984 (855).

**I. scabrida** DC. (Loc.-Chaul)

Pubescent herb. Flowers yellow spotted with red. Reeh, 2100 m. Aug. 1985 (1103).

RUTACEAE

**Boenninghausenia albiflora** Reich.

(Loc.-Pishukhair)

Herb with white flowers. Gangi, 2800 m. Aug. 1985 (1734, 1774).

**Skimmia laureola** Sieb. et Zucc. ex Walp. (Loc.-Nairpati, Kedarpati)

Unarmed shrub. Leaves when crushed emit orange fruit's smell. Flowers greenish-white. Banglaani, 2700 m. May 1984 (856).

**Zanthoxylum alatum** Roxb. (Loc.-Timru)

Shrub or small tree with red or gland dotted fruits. Reeh, 2100 m. July 1984 (1502).

AQUIFOLIACEAE

**Ilex dipyrena** Wall.

Tree with scarlet fruits. Gangi, 2500 m. June 1984 (5612).

CELASTRACEAE

**Euonymus echinatus** Wall.

Evergreen shrub with greenish-yellow flowers and echinate fruits. Sonari, 2600 m. July 1984 (5611).

**E. hamiltonianus** Wall.

Small deciduous tree with creamy white flowers and four lobed fruits. Sonari 2600 m. Oct. 1985 (5610).

**E. tingens** Wall. (Loc.-Konk, Bhanlai)

Evergreen tree with yellowish tinged flowers marked with brown. Banglani, 2700 m. Oct. 1985 (4738).

RHAMNACEAE

**Rhamnus triquetra** Wall. ex Roxb. (Loc.-Halith, Phalith)

Unarmed small tree with greenish flowers. Reeh, 2100 m. July 1984 (1244).

**R. virgatus** Roxb.

Thorny deciduous shrub with greenish, yellow flowers and green ovoid fruits. Gangi, 2500 m. June 1984 (4157).

VITACEAE

**Parthenocissus semicordata** var. **semicordata** (Wall. ex Roxb.) Planch.

Big climber in Oak-Rhododendron forest

with green fruits. Sonari, 2600 m. July 1984 (1245).

**Tetrastigma serrulatum** (Roxb.) Planch.

Climber with red spherical fruits. Reeh, 2100 m. July 1984 (4586).

ACERACEAE (SAPINDACEAE)

**Acer caesium** Wall. ex Brand. (Loc.-Manik)

Deciduous tree with greenish flowers. Kal-yani, 2600 m. July 1984 (703, 4703).

HIPPOCASTANACEAE

**Aesculus indica** Colebr. (Loc.-Paamal, Panger)

Large deciduous tree with white or purplish tinged flowers. Tonyaroo, 2750 m. June 1984 (4888).

ANACARDIACEAE

**Cotinus coggyria** Scop.

Syn. *Rhus cotinus* Linn.

Deciduous shrub with pale-purple flowers. Reeh, 2100 m. April 1984 (1246).

**Rhus javanica** Linn. (Loc.-Titmulya, Deshmela)

Syn. *R. chinensis* Miller

*R. semicordata* Murr.

Tree, with yellow flowers with red fruits. Gangi, 2500 m. July 1984 (4562).

CORIARIACEAE

**Coriaria nepalensis** Wall. (Loc.-Masuri, Gangaroo)

Shrub with succulent black wrinkled fruits. Gangi, 2500 m. April 1984 (4507).

FABACEAE

**Aeschynomene indica** Linn.

Glabrous herb, streaked with purple yellow flowers. Reeh, 1600 m. Aug. 1984 (760).

**Astragalus cashmirensis** Bunge (Loc.-Rudravanti)

Herb with pink flowers. Bajloo, 3500 m. July 1984 (4817).

**Caragana brevispina** Royle (Loc.-Gughtai)

Erect shrub with yellow flowers. Panyara, Birodh, 2750 m. May 1984 (1248).

**Desmodium elegans** DC.

Syn. *D. tiliaefolium* G. Don

Large shrub with pale-lilac flowers. Reeh, 2100 m. July 1984 (1251).

**D. laxiflorum** DC.

Erect shrub with hairy pink flowers. Ghutoo, 1500 m. July 1984 (656).

**D. motorium** (Houtt.) Merril.

Shrub with purple flowers. Reeh, 2000 m. Aug. 1984 (776).

**D. podocarpum** DC.

Herb with pink flowers and two jointed pods. Reeh, 2100 m. Sept. 1985 (652).

**D. sambuense** DC.

Syn. *D. flouribundum* Benth.

Shrub with pink or purple flowers. Ghutoo, 1500 m. Aug. 1984 (654).

**Eriosema chinense** Vogel (Loc.-Bhatya)

Bulbous herb with yellow flowers. Reeh, 2100 m. Aug. 1984 (4610).

**Indigofera heterantha** Wall. ex Brandis (Loc.-Sakinya)

Syn. *I. gerardiana* Wall.

Silvery pubescent tomentose shrub with red or purple flowers. Gangi, 2500 m. June 1984 (976, 821).

**Lespedeza gerardiana** Grah. ex Baker

Shrub with pale yellow flowers. Reeh, 2100 m. Aug. 1984 (790).

**Lotus corniculatus** Linn.

Glabrous herb. Flowers yellow streaked crimson. Henuri, 2750 m. July 1984 (3063).

**Parochetus communis** Buch.-Ham. ex D. Don

Prostrate hairy herb with deep violet flowers. Tonyaroo, 2750 m. June 1984 (5727).

**Piptanthus nepalensis** (Hook.) D. Don (Loc.-Fundanu, Phundanu)

Deciduous shrub with yellow flowers. Raipharkot, 2800 m. May 1984 (1248).

**Thermopsis barbata** Royle

Herb with violet or deep purple flowers. Bhelbagi, 3100 m. June 1984 (3089).

ROSACEAE

**Aruncus dioicus** subsp. **triternata** (Maxim.)

Hara

Syn. *A. silvestris* Kostel et Maxim.

Erect herb with white flowers. Banglani, 2700 m. July 1984 (1268).

**Cotoneaster acuminatus** Lindl. (Loc.-Chamruins)

Erect deciduous shrub with pink or white fragrant flowers. Gangi, 2500 m. May 1984 (1255).

**C. affinis** Lindl. var. **bacillaris** (Lindl.) Schneid. (Loc.-Ruins)

Shrub or small tree with white flowers and black fruits. Gangi, 2500 m. May 1984 (1269).

**C. confusus** Klotz.

Small tree with white flowers and blue fruits. Jalkala, 2400 m. June 1984 (1266).

**C. marginatus** (Lindl.) Schld.

Shrub with white flowers and red fruits. Gangi, 2500 m. June 1984 (1257)

**C. microphyllus** Wall. ex Lindl. (Loc.-Jheri)

Rigid much branched shrub with white flowers and red globose fruits on rocks. Gangi, 2500 m. June 1984 (1254).

**C. obtusa** Wall. ex Lindl.

Glabrous shrub with white flowers. Banglani, 2700 m. Aug. 1984 (1266).

**C. rosea** Edgew.

Small tree with white or pink flowers and bright red fruits. Gangi, 2500 m. June 1984 (1265).

**C. integrifolia** (Roxb.) Klotz.

Shrub with white flowers. Kalayani, 2600 m. June 1984 (1256).

**Deutzia staminea** R. Br. ex Wall. (Loc.-Ghugti)

Deciduous shrub with white-yellowish flowers. Reeh, 2100 m. June 1984 (1262).

**Filipendula vestita** (Wall. ex G. Don) Maxim. (Loc.-Ratanjot)

Syn. *Spiraea vestita* Wall. ex G. Don

Erect shrub with yellow-white flowers on rocks. Bhumka, 3200 m. Aug. 1984 (5717).

**Fragaria vesca** Linn. (Loc.-Gandkaphal)

Herb with white flowers and scarlet fruits. Saura, 2800 m. July 1984 (981, 780).

**Geum elatum** (Royle) Hook. f.

Herb with yellow flowers. Naumuthia, 2900 m. July 1984 (2720).

**Potentilla bifurca** Linn.

Small silky hairy herb with yellow flowers. Bhumka, 3200 m. Aug. 1984 (1259).

**P. fulgens** Wall. ex Hook. (Loc.-Bajaradanti)

Herb with yellow flowers. Jalkala, 2700 m. Sept. 1984 (720).

**P. gerardiana** Lindley ex Lehm.

Syn. *P. fragarioides* Linn.

Small hairy herb with light yellow flowers. Banglani, 2700 m. July 1984 (1004).

**P. leschenaultiana** Ser.

Robust hairy herb with yellow flowers. Kharsoli, 2800 m. Aug. 1984 (1258).

**P. nepalensis** Hook.

Hairy herb with dark crimson flowers. Kalayani, 2600 m. Aug. 1984 (721, 800).

**P. polyphylla** Wall. ex Lehm.

Glabrous herb with pale flowers. Deokhuri, 2700 m. Aug. 1984 (1261).

**Prunus cornuta** (Royle) Steud. (Loc.-Jamnai)

Tree with white flowers. Kalayani, 2600 m. May 1984 (4501).

**Sorbus cuspidata** (Spach.) Hedlund (Loc.-Moli)

Syn. *Pyrus vestita* Wall.

Deciduous small tree with white flowers and greenish-yellow often tinged with red spots fruits. Deokhuri, 2700 m. July 1984 (4507)



**Rosa sericea** Lindl. (Loc.-Rangel)

Shrub with white flowers. Gangi, 2500 m. May 1984 (4509).

**Rubus macilentus** Cambes. (Loc.-Peelu Hissol)

Evergreen shrub with white flowers. Henuri, 2750 m. June 1984 (1043).

**R. nutans** Wall. ex Hook.

Creeping shrub with stiff brown hairs. Flowers white, fruits dark red on rocks. Pachari, 2800 m. Sept. 1984 (4513).

**Sibbaldia cuneata** Hornem. ex O. Kuntze

Syn. *Potentilla sibbaldi* Hook. f. non Hallier f.

Shrub with pale yellow flowers. Tamakundo, 3400 m. June 1984 (1260).

**Sorbaria tomentosa** (Lindl.) Rehder.

Deciduous tree with white flowers. Rimchura, 3000 m. June 1984 (4548).

**Sorbus aucuparia** Linn.

Small tree with pink flowers and red fruits. Gangi, 2500 m. Aug. 1984 (1087).

**S. lanata** (D. Don) S. Schaur. (Loc.-Moli, Molya)

Syn. *Pyrus lanata* D. Don

Tree with pink flowers and red fruits. Bhelbagi, 3100 m. May 1984 (4511).

**S. foliolosa** (Wall.) Spach. (Loc.-Kyans).

Syn. *Pyrus foliolosa* Wall.

Small tree with white flowers and red fruits. Rimchura, 3000 m. June 1984 (3706).

**Spiraea bella** Sims.

Shrub with pink flowers. Paachari, 2800 m. April 1984 (1264).

**S. canescens** D. Don

Shrub with white flowers. Paachari, 2800 m. May 1984 (5706).

**S. gracilis** Maxim.

Syn. *S. parvifolia* Bert.

Shrub with white flowers. Naumuthia, 2900 m. June 1984 (5717).

SAXIFRAGACEAE

**Astilbe rivularis** Hamilt.

Erect hairy herb with greenish flowers in

moist places. Naumuthia, 2400 m. Aug. 1984 (3083).

**Bergenia stracheyi** (Hook. f. et Thoms.) Engl. (Loc.- Pashanbhed)

Herb with white flowers on rocks. Tamakundo, 3400 m. Aug. 1985 (5607).

**Chrysoplenium tenellum** Hook. f. et Thoms.

Procumbent glabrous herb with green, yellow flowers in moist places. Bhelbagi, 3100 m. June 1984 (1252).

**Hydrangea heteromella** D. Don

Syn. *H. vestita* Wall.

Small tree with yellow-green globose fruits. Deokhuri, 2700 m. May 1984 (3085).

**Parnassia laxmanni** Pall. ex Schult.

Syn. *P. ovata* Ledeb.

Herb with white flowers. Tonyaroo, 2700 m. April 1984 (4543).

**P. nubicola** Wall. ex Royle

Small glabrous herb with white flowers on grassy slopes near stream banks. Saura, 2800 m. July 1984 (3161).

**Saxifraga brunoniana** Wall. ex Sternberg

Herb with yellow flowers. Tonyaroo, 2750 m. June 1984 (846).

**S. diversifolia** Wall. ex DC. var. **parnassifolia** (D. Don) Engl.

Erect herb with yellow flowers. Henuri, 2750 m. July 1984 (3289).

**S. filicaulis** Wall. ex Ser.

Procumbent herb with yellow flowers on flat mossy boulders. Bhelbagi, 3100 m. Aug. 1984 (3080).

**S. fimbriata** Wall.

Herb with yellow flowers. Tamakundo, 3400 m. Aug. 1985 (845).

**S. flagellaris** Willd. ex Sternb.

Small hairy erect herb with yellow flowers. Chauki, 3500 m. July 1984 (3081).

GROSSULARIACEAE

**Ribes alpestre** Decne. ex Jacq.

Syn. *R. grossularia* Clarke

Large prickly shrub with greenish flowers

and green fruits. Rimchura, 3000 m. May 1984 (4542).

**R. glaciale** Wall. (Loc.-Himoch, Kaladani)

Unarmed shrub with green or pink flowers and fruits. Rimchura, 3000 m. May 1984 (4543).

CRASSULACEAE

**Rhodiola crenulata** (Hook. f. et Thoms.) Ohba

Syn. *Sedum crenulatum* Hook. f. et Thoms.

Herb with purple flowers. Chauki, 3500 m. Aug. 1984 (3066).

**Rosularia rosulata** (Edgew.) Ohba

Syn. *Sedum rosulatum* Edgew.

Sarmentose fleshy herb with white flowers on moist rocky places in Oak-Rhododendron forest. Kalayani, 2700 m. April 1984 (3064).

**Sedum crassipes** Wall. ex Hook. f. et Thoms.

Syn. *S. asiaticum* Clarke in FBI non DC.

Succulent herb with yellow flowers on rocks. Bangalani, 2700 m. Aug. 1984 (3065).

**S. linearifolium** Royle

Succulent herb with red tipped flowers on rocks.

Tamakundo, 3400 m. Sept. 1985 (905).

**S. quadrifidum** Pall.

Woody herb with short shoots, reddish leaves and flowers. Tamakundo, 3400 m. Sept. 1985 (5313).

**Sinocrassula indica** (Decne.) Barger

Syn. *Crassula indica* Decne.

Erect succulent herb with yellow flowers. Kharsoli, 2900 m. Sept. 1985 (2067).

ONAGRACEAE

**Circaea imaicola** (Asch. et Magn.) Hand.-Manz.

Syn. *C. alpina* Clarke

Erect herb with white flowers on rocks. Gangi, 2500 m. Aug. 1984 (466, 766).

**Epilobium roseum** (Schret.) Pers.

(Loc.-Aatrasu)

Erect herb with pink flowers. Sonari, 2650 m. Aug. 1984 (4560).

**Oenothera rosea** (Soland) W. Ait.

Erect herb with pink flowers. Reeh, 2100 m. Aug. 1984 (1017).

CUCURBITACEAE

**Gomphogyne cissiformis** Griff.

Twiner with greenish yellow flowers. Rimchura, 2900 m. Aug. 1984 (1270, 1054).

**Melothria heterophylla** (Lour.) Cogn. (Loc.-

Bon kakri)

Glabrous climber with pale yellow flowers and red fruits. Kalayani, 2650 m. June 1984 (4582).

BEGONIACEAE

**Begonia picta** Smith (Loc.-Pattharchata)

Succulent herb with pinkish-white flowers on rocks. Deokhuri, 2700 m. Aug. 1984 (4644).

APIACEAE

**Bupleurum candolii** Wall. ex DC.

Erect herb with yellow flowers. Bhelbagi, 3100 m. July 1984 (4604).

**B. falcatum** Linn. var. **marginatum** Wall. ex DC.

Erect herb with yellow flowers. Bhumka, 3200 m. Aug. 1984 (4603).

**Chaerophyllum acuminatum** Lindl.

Erect hairy herb with white flowers. Nauthia, 2900 m. June 1984 (1276).

**C. villosum** Wall. ex DC.

Erect large hairy herb with white flowers. Raipharkot, 2850 m. June 1984 (1272).

**Heracleum candicans** Wall.

Large hairy herb with pinkish white flowers. Bhelbagi, 3100 m. July 1984 (1273).

**Ligusticum elatum** Clarke

Erect glabrous herb with white flowers.

Kharsoli, 2800 m. Aug. 1984 (1271).

**L. marginatum** Clarke

Tall herb with white flowers. Naumuthia, 2900 m. Aug. 1984 (1250).

**Pimpinella acuminata** Clarke

Erect herb with yellow green flowers. Kharsoli, 2800 m. July 1984 (1273).

**P. diversifolia** DC.

Hairy erect herb with white flowers. Raipharkot, 2850 m. June 1984 (1282).

**Pleurospermum angelicoides** (DC.) Clarke

(Loc.-Lesser)

Syn. *Pterocyclus angelicoides* (Wall.)

Klotzsch.

Robust herb with white flowers and oblong-elliptic green fruits. Bajloo, 3500 m. Aug. 1984 (1280).

**P. candolii** (DC.) Benth.

Aromatic erect herb with purple flowers. Bhelbagi, 3100 m. Aug. 1985 (1277).

**P. densiflorum** (Lindl.) Clarke

Small tufted herb with greenish white flowers. Bhelbagi, 3100 m. Aug. 1985 (1275).

**Selinum vaginatum** Clarke (Loc.-Bhutkesh)

Large herb with white flowers. Kharsoli, 2800 m. Sept. 1985 (1281).

CAPRIFOLIACEAE

**Leycesteria formosa** Wall.

Erect glabrous shrub with ovoid red fruits in clusters. Jalkala, 2700 m. Sept. 1985 (1288).

**Lonicera angustifolia** Wall. ex DC.

(Loc.-Gulnar)

Erect shrub with white flowers and red fruits. Bhelbagi, 3100 m. May 1984 (791).

**L. myrtilus** Hook. f. et Thoms. var. **depressa** Rehder

Syn. *L. parvifolia* Hook. f. et Thoms. non Edgew.

Erect tufted shrub with white flowers and red fruits. Naumuthia, 2900 m. June 1984 (1287).

**L. quinquelocularis** Hardw.

Large shrub with yellowish-white hairy flowers. On rocks. Birodh, 2700 m. July 1984 (5738).

SAMBUCACEAE

**Viburnum cotinifolium** D. Don

Large deciduous shrub with dark purple flattened fruits. Gangi, 2500 m. July 1984 (4521).

**V. cylindricum** Buch.-Ham. ex D. Don

(Loc.-Karua)

Syn. *V. coriaceum* Bl.

Small tree with sweet scented flowers and dark purple fruits. Reeh, 2200 m. July 1984 (1228).

**V. mullaha** Buch.-Ham. ex D. Don

(Loc.-Titmulya)

Syn. *V. stellulatum* Wall.

Large shrub with globose bright red fruits. Sonari, 3700 m. Sept. 1985 (4518).

**V. nervosum** D. Don (Loc.-Timol, Titmulya)

Syn. *V. foetens* Decne.

Deciduous shrub with pale pink flowers and purple fruits. Deokhuri, 2700 m. July 1984 (4519).

BORAGINACEAE

**Borreria stricta** Linn.

Small erect herb with white flowers. Reeh, 1700 m. June 1984 (883).

**Hymnopoigon parasiticus** Wall.

Epiphytic shrub with white flowers. Gangi, 2500 m. June 1984 (874).

**Galium acutum** Edgew.

Scandent glabrous herb with whitish yellow flowers and black when drying. Tamakundo, 3400 m. Sept. 1985 (3058).

**G. mollugo** Linn. subspp. **asperifolium**

(Wall. ex Roxb.) Kitamura

Trailing herb with white flowers. Henuri, 2700 m. Aug. 1984 (1292).



**G. rotundifolium** Linn.

Trailing herb with white flowers. Gangi, 2500 m. July 1984 (888, 889).

**Onosma emodi** Wall.

Hairy herb with blue flowers. Tamakundo, 3400 m. Sept. 1985 (5739).

**Rubia cordifolia** Linn. var. **manjista** Miguel.  
(Loc.-Manjistha)

Syn. *R. cordifolia* Linn.

Climbing herb with white flowers. Reeh, 2100 m. July 1984 (1052).

VALERIANACEAE

**Nardostachys grandiflora** DC. (Loc.-Maansi)

Erect herb rooting in crevices of boulders with yellowish or light blue flowers. Bajloo, 3500 m. Aug. 1984 (4823).

**Valeriana hardwickii** Wall.

Aromatic rhizomatous herb in crevices of rocks with pinkish, white flowers. Bhumka,

3100 m. Aug. 1984 (873).

**V. jatamansi** Jones

Syn. *V. wallichii* DC.

Herb with white flowers. Henuri, 2700 m. June 1984 (1293).

DIPSACACEAE

**Dipsacus mitis** D. Don

Syn. *D. inermis* Wall.

Large hairy herb with white flowers. Kalayani, 2500 m. Aug. 1984 (687).

**Morina longifolia** Wall. ex DC. (Loc.-Somrus)

Large spiny herb with pale purple flowers. Kalayani, 2600 m. Aug. 1984 (687).

**Triplostegia glandulifera** Wall. ex DC.

Glandular small herb with yellow flowers. Saura, 2800 m. May 1984 (3086).

(to be continued)